**Project: Automatic assessment of the degradation of bio-plastic particles using fluorescence flow-cytometry**

***Goal***

The goal of the project is to analyze the obtained research data from flow-cytometry and develop with machine learning an analysis pipeline that can distinguish PHBV particles from bacteria, and that subsequently extracts a numeric measure of how much the plastic particles in a sample have degraded.

A Future goal is to determine which types of bacteria are most effective at degrading bioplastics, and under which conditions this best occurs.

***Flow-cytometry***

Flow-cytometry is a technique to detect and measure psychical and chemical characteristics of cells or particles. It measures forward and sideward scattering light. The scattering of light means the deflection, by diffraction of light against particles. Bacteria or plastics flow through a microscopically narrow tube and pass through a laser beam. The strength and ratios of the scattered light intensities can be used to assess the nature and characteristics of cell/particles.

***PHBV***

Bioplastic are polymers produced by micro-organisms. An example of a bioplastic is PHBV. PHBV is short for Poly(3-hydroxybutyrate-co-3-hydroxyvalerate). PHBV is a thermoplastic polymer, which is:

* Brittle
* Low elongation at break
* Low impact resistance

The applications for PHBV are:

* Controlled release of drugs
* Medical implants and repairs
* Specialty packaging
* Orthopedic devices

PHBV is also bio-degradable which can be used as an alternative to non-biodegradable plastics. And it is renewable. But is has it drawbacks. It is expensive to make and has a low thermal stability.